

Abstract

Pump and cannula systems inserted through the right side and/or left side of the heart provide protection against collapse of the heart chambers and veins and arteries and provide supplemental blood flow through same to enable beating heart or
5 still heart surgery, such as bypass surgery, on all vessels of the heart, including lateral and posterior vessels. Pump and cannula systems are provided for supporting pulmonary and/or circulatory blood flow external of the heart during any beating heart or still heart surgical procedure, including value repair or replacement. The invention eliminates the use of cardiopulmonary bypass (CPB) machines in all heart
10 surgery and utilizes the patient's lung(s) for providing oxygenated blood during heart surgery. The invention further provides stents adapted for protecting from vein, artery, atrium and/or ventricle collapse during beating heart bypass surgery.